

ON SOME RARE AUSTRALIAN GOMPHINÆ, WITH
DESCRIPTIONS OF NEW SPECIES.

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(Plates xxii.-xxiii.)

The present paper is an attempt to collect together and bring up to date all the facts which have come to light concerning Australian *Gomphinae* since the publication by me, in 1905, of descriptions of three new species, *Austrogomphus arbustorum*, *A. arenarius*, and *A. prasinus*.

Owing to their restricted distribution and seasonal range, the members of the genus *Austrogomphus* are not easily studied by anyone unable to visit many new localities at different periods of the year. Though in temperate climates these insects are restricted to a brief range of about two months, December and January, yet in tropical Queensland this is not the case. A locality may be visited in December, and yield several species; on a second visit, made in April or May, all those species found in December will be absent, and other new species will have taken their place. Whether any of these species have a long seasonal range, can only be determined by continuous collecting in the same locality throughout the year; at present, it is generally believed that no single species of the subfamily *Gomphinae*, either in tropical or temperate climates, has a seasonal range of more than three or four months at the outside.

Besides this fact, the peculiar habits of these insects render them difficult to obtain even in the most favourable localities. One day they may be found abundantly in a particular spot; but a visit to the same place on an equally favourable day shortly afterwards may result in complete failure. Some species, whose larvæ swarm in the mountain creeks, are seldom seen on the wing; and what becomes of the thousands of imagoes that must

certainly breed out from these larvæ, still remains a matter for conjecture.

Bearing these facts in mind, we may confidently expect that new species will continue to be found in all parts of Australia for many years to come; nor is it likely that we shall reach a complete knowledge of this genus until more workers in many localities are induced to study these insects.

De Selys described in his four works on the *Gomphine* (Synopsis des Gomphines, 1854; Additions, 1859; Seconde et 3^{me} Additions, 1869, 1873) ten species of the grand genus *Gomphus* from Australia. For the reception of these he proposed the subgenera *Austrogomphus* and *Hemigomphus*, relegating one species only to the Old-World subgenus *Onychogomphus*, viz., *O. præruptus*. The two former subgenera were, however, purely artificial, and in 1901, M. René Martin placed all ten species in the single genus *Austrogomphus*, and added two new species from Queensland. It seems best to keep to this arrangement for the present, until a careful study of both larval and imaginal forms may reveal some distinct lines of separation. As regards wing-venation, all the species are practically alike. Very little variation in this respect can be found throughout the whole subfamily, and this makes the work of subdivision very difficult. Natural selection seems to have mainly busied itself, in this subfamily, with providing each distinct form with appendages differing widely from those of its nearest allies. In this we see a wise provision for the preservation of the species; for amongst insects so seldom on the wing and so widely scattered, every chance meeting of a male and female must be made use of; the capture of the latter by the former must be swift and certain; and to this end, specialization has proceeded to great lengths in the form of the male abdominal appendages; and also, as a complementary result, in the structure of the occiput of the female, which becomes modified to suit the grasp of the male.

Throughout the subfamily protective colouration is found. Corresponding to their forest habitat, we find a general scheme of colouration, in which the markings are always some shade of

green or yellow on a black or dark brown ground. In the genus *Austrogomphus* the thoracic markings in particular are of great value in determining species, very little individual variation being found. By referring to Plate xxii., fig. 11, the whole scheme of thoracic markings may be readily understood. The figure is diagrammatic, and represents the whole of the thorax, except the prothorax, flattened out. Both sides of the upper surface or mesepisternum (*A*) are shown; the whole being crossed longitudinally by the mid-dorsal ridge or carina (*h*) ending in the cross-suture called the interalar ridge (*e*). Besides this, on each side, well forward, is a slanting transverse suture, the two together forming the mesothoracic collar, or half-collar (*g*). On the mesepisternum we have the following scheme of markings:—*a*, the border mark, next the prothorax; *b*, the half-collar mark; *c*, the dorsal stripe or band; *d*, the antehumeral stripe or band; and *e*, the mid-dorsal line. In many species, *b* and *c* coalesce, forming a more or less perfect representation of a figure "7"; the two together may then be called the "seven-mark." Also the antehumeral stripe, which is always narrow, is in some species broken up into a fine line followed by a round or triangular spot. Coming now to the side of the thorax, *i.e.*, that portion lying below the humeral suture (*i*), we have the large areas, separated by parallel sutures called the upper or first lateral suture (*j*) and the lower or second lateral suture (*k*); these are the mesepiméron (*B*), metepisternum (*C*), and metepiméron (*D*); there is also a small piece in front, near the coxa, called the mesinfraepisternum (*E*). Generally, over the whole of this portion of the thorax the paler colour predominates, with more or less regular dark lines or bands following the sutures. But in some species these bands are very broad, and coalesce, isolating large oval yellow spots. The complete thoracic scheme alone is generally sufficient to determine the species to which any specimen of *Austrogomphus* belongs.

For further specific differences, recourse must be had to sexual characters. The abdominal characters of the males are so diverse and peculiar that it is generally easy to determine them. The females are more difficult to separate; but in any cases where

the thoracic scheme is not sufficiently different between two species (as in *A. collaris* and *A. australis*) the form of the occiput will determine the species.

During the spring of 1908, I was able to collect and to breed out the larvæ of four species of *Austrogomphus* occurring near Sydney. An account of these is reserved for another paper, it being only necessary to say here that a study of the larvæ will probably enable us to subdivide our large and increasing genus into two, or possibly three, homogeneous groups, differing in important respects both in habit and structure.

Of the new species described in this paper, one was taken by me first in 1907, on Duck Creek, near Sydney, and appears to be firmly established there, though never common. Another I obtained during my visit to Cooktown in January, 1908. My friend, Mr. Allen, of Cairns, took a very remarkable new species at Atherton, N.Q., in April, 1907, and at the same time found the rare *Austrogomphus Risi* Martin, of which the female alone was known. Mr. F. P. Dodd, of Kuranda, is the discoverer of another unique male, which I have dedicated to him. Descriptions of these species, together with some notes on other rare species, are given below.

1. AUSTROGOMPHUS MELALEUCE, n.sp.

♂. Total length 43 mm.; abdomen 32 mm.; forewing 26 mm., hindwing 25 mm.

Wings:—*neuration* black. *Pterostigma* broad, convex, black, 2·7 mm. *Membranule* nil. *Nodal Indicator* || 11-13 7-10 |
|| 8-9 6-9 |

Head: *eyes* black, a large round yellow spot underneath on the orbits, a smaller spot close to it, in front; *occipital ridge* 0·6 mm., yellow; *vertex* black; *ocelli* black, collinear, on three equal tubercles; *antennæ* black, basal joint thickened, a yellow half-circle at bases; *front* rather large, bright yellow, slightly cleft medially; *postclypeus* jet black; *anteclypeus* pale yellow or cream-coloured; *labrum* same colour, crossed in the middle by a broad black vertical bar; *labium* pale dull cream or

straw-colour; *genæ* cream-coloured; *mouth* thickly edged with black or dark brown. *Thorax*: *prothorax* black; a yellow spot on neck; behind this an elongated yellow spot on collar; a tiny double yellow spot in the middle, and a single small spot behind next mesothorax. *Meso-* and *metathorax* black marked as follows with bright lemon-yellow:—on the mesepisternum, a small border mark, a short thin mid-dorsal line; a pair of very conspicuous “seven-marks,” in which the head is short, thick, and blunt, and the tail rather broad and not much pointed; the antehumeral band is represented by a short fine line, with a large roundish spot at some distance behind; in some specimens the spot only is present. Sides of thorax shiny black, isolating two large oval yellow spots, one mainly in *C*, but with the upper part in *B*, and the other low down on *D* close to abdomen; besides these, a yellow mark on *E*, a small spot on *C* near wings; a small round spot on *D*, close under the wing-joints, and a larger round spot on *D*, in front (see Plate xxii., fig. 1); *notum* black, *scuta* and *scutella* bright yellow. *Legs* black, underside of profemora with a yellow stripe, *coxæ* pale cream-coloured. *Abdomen*: 1-2 swollen, 7-10 strongly clubbed. Colour black, marked as follows: 1, a large transverse dorsal yellow spot; 2, auricles large, bright yellow; behind them an anal lateral yellow mark; 2-6, a yellow dorsal line, widest on 2, reaching nearly the whole length of segments 2-4, but only about two-thirds of 5, and barely half of 6; each of these segments is marked low down on each side by a pale yellow streak, enlarged at base into a basal sublateral spot, and running alongside the ventral carina, which is black; 7, first three-fifths bright yellow, crossed about 1 mm. from base by a fine black line about 1 mm. long; rest of 7 black, with a small anal lateral spot on each side; 8, an irregular yellowish basal sublateral mark on each side, and an anal lateral yellowish spot, somewhat triangular; 9, black, suture slightly touched with yellow; 10, black. Below, 8 extends downwards on each side in a large curved plate or sheath. *Appendages*: *superior*, 1 mm., very divergent, cornute, slightly hairy, bases broad and separated; colour bright yellow; each carries underneath an inner

lobe or projection, thinner, curved downwards and inwards, black; the tips of these two lobes are fairly close together. *Inferior* strongly bifurcated, the two portions wide apart, 0.6 mm., thick, blunt, upcurved, black, downy (see Plate xxiii., figs. 9 and 10; in fig. 9 the abdomen was slightly turned up to show all parts).

♀. Total length 48 mm., abdomen 34 mm.; forewing 28 mm., hindwing 27 mm. It differs from the male as follows: *Pterostigma* 3 mm.; very often a tinge of yellow on wings from base up to nodus. *Occiput* with two small yellow tubercles in centre at back of ridge, tips black (see Plate xxii., fig. 9). Abdomen: 1-2 swollen, not cylindrical, thicker than in male, 7-10 somewhat enlarged when seen sideways. Markings more conspicuous; 3-6 with the basal sublateral yellow spot large, triangular, and separated from the yellowish edging of the ventral carina; 7 with a small round anal yellow spot on each side; 10 ending below in a dark brownish tubercle, slightly hairy; a smaller round tubercle above it, between appendages. Appendages: 0.9 mm., wide apart, subconical, light yellow, tips black.

This species is very close to *A. praeruptus* Selys, described from a unique specimen (♀) from Adelaide. The latter is a larger species, abdomen 38 mm., hindwing 28.5 mm.; it differs from *A. melaleuca* in having "three yellow points on the nasus and front" and in the occiput carrying "two small black points, close together." I have not seen the type of *A. praeruptus*, which is in the de Selys Collection at Brussels, but I sent specimens of *A. melaleuca* to M. René Martin, who considers them a distinct new species.

Hab.—Duck Creek, Auburn, near Sydney, N.S.W. Rare; December-February.

This beautiful Gomphine differs from all others I have seen in the richness of its yellow colouring, which is a brilliant lemon-colour. In that respect it resembles *Synthemis regina* Selys, which accompanies it in the bush near Duck Creek. Probably the same causes have operated on these two species to bring about the same colouration. It is also the only Gomphine known to me which inhabits a sluggish stream. All the others prefer clear mountain streams.

Apparently this species disappears into the bush soon after emergence. One day, at the end of January, 1908, I took five or six males flying up and down the creek, but I have never seen them there since. All the other specimens I have, were taken, one or two at a time, in the teatree bush fringing the creek. The insect is very fond of sitting perched high up on a sprig of teatree, sometimes beyond reach of the net. If disturbed, it flies off with bewildering swiftness and settles on another bush. I have named it *A. melaleucæ* because of this habit. It is not at all easy to capture. The females are very rare, and I have never seen a pair in cop.

2. AUSTROGOMPHUS BIFURCATUS, n.sp.

♂. Total length 43 mm.; abdomen 32 mm.; forewing 26 mm., hindwing 25 mm.

Wings: *neurulation* black. *Pterostigma* 3 mm., black, not very broad, nearly straight below. *Membranule* almost nil.

Nodal Indicator || 13-14 8-9 |
 || 10 9-10 |

Head: *eyes* brown; *occipital ridge* nearly 1 mm., black, hairy; *vertex* black; front *ocellus* transparent; *front* black, with a rather narrow yellow band along frontal ridge; *post-clypeus* black, hairy, a small yellow area on each side next the *anteclypeus*, which is yellow; *labrum* black, *genæ* yellow; *labium* pale straw-colour, *mouth* edged with dark brown. Thorax: *prothorax* rather broad, black, a yellow spot in front, and a small yellow central double spot. *Meso-* and *metathorax* jet black above, the markings of the mesepisternum as follows: no border mark, no mid-dorsal line, interalar ridge yellow, half-collar and dorsal stripe combined to form a "seven-mark" on each side, the head being a fairly long oval, rather pointed, to which the tail is attached more than half-way from the upper angle; the tail itself is rather narrow and pointed; antehumeral stripe narrow, ending near wings in a subtriangular enlarged spot. On the sides the colour is yellow, but the black groundcolour from above intrudes beyond the humeral suture so as to cover the most of *B* and half

of *E*; the part of *C* and *D* close under the wing-join is irregularly marked with black, especially along the sutures, and the spiracle carries a small black spot (see Plate xxii., fig.2); *notum* black, *scuta* and *scutella* yellow. *Legs* black, underside of profemora yellow, coxæ pale brownish. *Abdomen*: 1-2 enlarged, 3-7 very slender, 8-10 enlarged. Colour jet black; 1-2, a large yellow dorsal mark, also yellow on sides and auricles; 3-6, on each side a basal subtriangular yellow spot; 7, a pair of larger spots, close together, about 1 mm. from base; 8-10, without spot. *Appendages*: *superior* very remarkable; 1.6 mm., bases separated, straight, cylindrical, jet black, hairy, *strongly bifurcated*; the outer fork being the longer, fairly pointed, the inner somewhat shorter, very pointed. *Inferior* bifurcated, the two parts widely separated, 0.5 mm., very thin, hooked or curved upwards, black (see Plate xxiii., figs.7 and 8).

♀. Unknown.

Hab.—Atherton, N.Q. Very rare; April.

Two males of this remarkable insect were taken by my friend, Mr. E. Allen, of Cairns, in April, 1907. It probably only emerges after the heavy monsoonal rains of February and March. It was certainly absent during my visit to Atherton in January, 1905.

This species cannot possibly be confounded with any other known species, its remarkable appendages being totally unlike anything hitherto found in the subfamily *Gomphinae*. Probably its nearest ally is *A. prasinus* Tillyard, in which the appendages have a small bifurcation.

3. AUSTROGOMPHUS COMITATUS, n.sp.

♂. Total length 42 mm.; abdomen 31 mm.; forewing 25 mm., hindwing 24 mm.

Wings: *neuration* black, costa slightly yellowish outwards; base lightly suffused with pale yellow for 4.6 mm. *Pterostigma* thick, 2.5 mm., dark brown between black nervures. *Anal angle* 3-celled. *Nodal Indicator*

13	9-10
9	8-9

Head: *eyes* dark brown; *occipital ridge* 1mm., black with a large squarish greenish-yellow spot; *vertex* black, *ocelli* prominent, the two lateral ones raised on tubercles; *antennæ* black, with a pale ring at bases; *front* with a greenish-yellow band above, a thick black band on face; *clypeus* greenish-yellow with a thick black band; *labrum* with a large black subtriangular centre surrounded by a yellowish border; *labium* dull dirty brown edged with yellowish. **Thorax:** *prothorax* black, a small double dorsal spot and a pair of lateral spots, greenish. *Meso-* and *metathorax* black above, the mesepisternum marked as follows: a greenish border-mark, an elongated half-collar mark on each side; dorsal band shortened to an elongated oval mark, the upper end of which is some distance from the half-collar, so that no "seven-mark" is formed; antehumeral stripe narrow, slightly curved, ending in an enlarged subtriangular spot near wing-joints; all these marks rich green. Sides of thorax greenish-yellow, with two triangular subparallel narrow black bands along the sutures; the upper one narrowed in the middle and extending in a sharp point downwards in front, the lower very narrow but less irregular; *E*, black with a yellow stripe (see Plate xxii., fig.3); *notum* black, *scuta* and *scutella* yellowish; *underside* dull yellowish, with two cloudy black spots. *Legs* thick, black, underside of profemora with a yellowish stripe. **Abdomen:** 1-2 swollen, 3-7 very narrow, 8-10 sharply clubbed, 8-9 broadly sheathed below. Colour black marked with yellow as follows: 1-2, a longitudinal dorsal band, sides and auricles largely yellow; 3, a narrow transverse basal band, formed by two roundish spots touching dorsally; a small round central spot; 4-7, a narrow basal band; 8, a round basal spot on each side, sheaths edged with yellow, and carrying a tiny tuft of hairs; a fine transverse anal line; 9, a suspicion of a fine transverse anal line; sheaths touched with yellow; underside of 9 dull yellow; 10, broad, black. **Appendages:** *superior* very wide apart at bases, converging towards tips; 2 mm., thick, strong, somewhat hairy, subcylindrical, broad and blunt at tips; flattened slightly on the inside just before tips, and then hooked or curved inwards into a small

rounded projection; basal three-sevenths black, rest yellow, tips just touched with black. *Inferior* black, bifurcated, the two branches wide apart, 1.2 mm., rather slender, black, tips turned upwards suddenly into a sharp point (see Plate xxiii., figs. 1 and 2).

♀. Total length 43 mm., abdomen 32 mm.; forewing 28 mm., hindwing 27 mm.

It differs from the male as follows. *Pterostigma* 3.2 mm. Head: *front* and *clypeus* distinctly hairy on each side; the broad frontal band connected behind by a fine black median stem to the vertex; *occiput* with a very strong black central spine or elongated tubercle (see Plate xxii., fig. 10). Abdomen: stouter and more cylindrical, 1-2 and 8-10 very slightly enlarged: 1, yellow above; 2, a thin yellow dorsal line, sides yellow; 3, with a pair of basal lateral rounded yellow spots and a pair of narrow oval central yellow spots, two-fifths from base of segment; 4-5, with large basal yellow spots on each side, and also a tiny mark on each side, two-fifths from base of segment; 6-7, large basal yellow spots on each side; 8, with small double basal yellow spots low down on each side; 9-10, black, sutures touched with yellow; sheaths of 8-9 touched with yellow; vulvar scale with two short black bifurcations, separated. Appendages: separate, straight, 1 mm., subconical, not very sharply pointed, somewhat hairy, bright yellow, a black spot at base.

Hab.—Cooktown, N.Q. Rare; January, 1908.

I found it only in a secluded spot at the back of Mount Cook, where it inhabits a small mountain brook. It flies in small clearings in company with *Synthemis Olivei* Tillyard. I took three males and two females in good condition.

This species is closely allied to *A. heteroclitus* Selys, a species which occurs locally in New South Wales and Victoria. It can be distinguished readily from the latter as follows: smaller size, front and face much blacker; dorsal stripes shorter and narrower; sides of thorax with two black bands instead of only one half band as in *A. heteroclitus*. In the latter, too, the notum is much yellower; so are also segments 1-2 of abdomen. The superior appendages of the male resemble those of *A. heteroclitus* in shape,

but the latter are entirely yellow, except a small black spot at bases; also the male *A. heteroclitus* carries under segment 7 a large tuft of hairs, which is absent in *A. comitatus*. Finally, in *A. heteroclitus* female, the occiput is more yellow and lacks the sharp spine which *A. comitatus* possesses, carrying instead a row of black hairs.

4. AUSTROGOMPHUS MANIFESTUS, n.sp.

♂. Unknown.

♀. Total length 48 mm., abdomen 36 mm.; forewing 27 mm., hindwing 26 mm.

Wings: *neururation* strong, black. *Pterostigma* 3 mm., thick, black. *Nodal Indicator* $\left\| \begin{array}{cc} 12-14 & 9-10 \\ 9 & 9 \end{array} \right\|$

Head: *eyes* dark brown; *occipital ridge* black, touched with yellow, but carrying *no tubercle*; *vertex* black, lateral *ocelli* tubercled; *antennæ* black with a basal yellow half-ring; *front* yellow above, the black of the vertex advancing centrally into the yellow; *face* yellow, with a broad black band covering the lower part of front and upper part of postclypeus; rest of *clypeus* yellow; *labrum* yellow, crossed by a vertical bar, and with a basal black band and a black edging in front; *labium* yellowish, *mouth* broadly black. Thorax: *prothorax* black, with a small double dorsal yellow spot. *Meso-* and *metathorax* black above; the mesepisternum marked with yellow as follows: no border-mark, a short yellow dorsal line, interalar ridge yellow, half-collar marks and dorsal stripes combined on each side to form a beautiful "seven-mark" in which both the head and tail are well pointed, and the tail very slightly curved; antehumeral stripe represented by a fine line only about 1 mm. long followed behind by a small triangular spot near wing-joins. On the sides two thick black bands have merged together, isolating a tiny yellow spot on the second lateral suture; a large upper irregular oval patch of bright yellow is isolated between these bands and an upper black band formed by the black upper groundcolour extending downwards past the humeral suture; there is also a large patch on *E*, a large roundish spot well forward on *C*, near

coxa, and finally a very large irregular patch of bright yellow occupying most of *D* and lying close to abdomen; *underside* with a large dull black patch (see Plate xxii., fig.4); *notum* black; *scuta* and *scutella* yellow. *Legs* black, a tiny spot on elbow of forelegs, and a bright yellow band on underside of profemora. Abdomen: 1-2 swollen, rest long and rather slender, 7-8 slightly broader, 9-10 narrow, cylindrical. Colour black, marked with yellow as follows: 1-2 with a rather broad dorsal mark pointed anally, sides with large irregular blotches of yellow; 3, a pair of large basal lateral semi-oval spots; 4-6, with smaller basal spots; 7, basal third bright yellow, partly crossed on each side from below by a transverse black line; 8-10, jet black; vulvar scale of 8 with a peculiar prominent projection, 1 mm. long, bifurcated, black, and shaped as shown in the figure (see Plate xxii., fig.7). Appendages: short, 0.6 mm., bright yellow, straight, conical, pointed, rather close together.

Hab.—Kuranda, N.Q. Very rare; January, 1909. A unique female taken by Mr. E. Allen.

This species is probably nearest to *A. bifurcatus*, of which the female is not known. It cannot be the female of that species, however, as the markings of head, thorax, and abdomen are entirely different. Judging from the slenderness of the abdomen of the female, the male should be exceedingly slender, as is the male of *A. bifurcatus*.

5. AUSTROGOMPHUS DODDI, n.sp.

♂. Unique. Total length 43 mm., abdomen 32 mm.; forewing 25 mm., hindwing 24 mm.

Wings: *costa* yellowish outwards, rest of *neuration* black. *Pterostigma* 3 mm., bicolorous, having a pale creamy centre surrounded with black. *Membranule* almost nil. *Nodal Indicator*

14	9-10
10-11	10

Head: *eyes* brown; *occipital ridge* 0.8 mm., black with a large yellow spot; *vertex* black, with a small round yellow spot behind, enclosed in front by a high ridge or tubercle,

outside of which the three *ocelli* are set, nearly in a line; the black colour extends just on to the base of the front; rest of *front* yellow, except a rather narrow straight black band crossing the face just above the postclypeus; *clypeus*, *labrum*, *labium*, and *genæ* yellow, an indistinct black line in suture between clypeus and labrum; *mouth* edged with dark brown. *Thorax*: *prothorax* black, a yellow band along the collar in front, a tiny double yellow spot behind, and on each side a small yellow spot. *Meso-* and *metathorax* black above, the mesepisternum marked with yellow as follows: no border-mark, a fine mid-dorsal line about 1 mm. long, slightly forked behind; interalar ridge marked with yellow; the half-collar mark oval, and *just* joined to the dorsal stripe so as to form a "seven-mark," in which the tail joins the head about its middle; antehumeral mark consisting of a fine line *just* joined to a triangular spot near wing-joints; sides bright yellow with an irregular black band along the first lateral suture, and a narrow irregular black line along the second lateral suture; *E*, black; spiracle carrying a black spot (see Plate xxii., fig. 5); *notum* black; *scuta* and *scutella* yellow; *wing-joints* black with small yellow spots. *Legs* black, underside of profemora yellowish-grey, coxæ yellow. *Abdomen*: 1-2 swollen, 3 to middle of 7 very slender, rest of 7-10 somewhat clubbed. Colour black; 1-2 with a clear yellow dorsal mark in the form of a cross; auricles and most of sides yellow; genital appendages of 2 bordered with black; 3, a fine yellow dorsal line, reaching to about 1 mm. from end of segment, a pair of basal yellow spots almost touching above; 4, a transverse yellow basal band and a fine dorsal line about 3 mm. long; 5-6, a transverse yellow basal band; 7, basal half yellow, crossed on each side by a fine black line, rest black; 8, black, a rather large yellow mark low down on each side; 9, black with a basal yellow spot on each side; 10, black. *Appendages*: *superior* 14 mm., slightly separated at bases, divergent, cornute, slightly hairy, rather slender, very sharply pointed, yellow with black tips; each carries underneath, near its base, a hooked tubercle of fair size, colour yellow tipped with dark brown. *Inferior* bifurcated, the two branches wide

apart, short, black, thin, somewhat hooked or turned upward (see Plate xxiii., figs. 5 and 6).

Hab.—Kuranda, N.Q. Very rare; November, 1906. A single male taken by Mr. F. P. Dodd.

It is allied to *A. arbustorum* Tillyard, from which, however, it is easily distinguished by the larger and sharper appendages; the bicolorous pterostigma is a feature which I have not noted before in tropical species, though it occurs more or less in all the southern species. Of these latter, *A. ochraceus* Selys, *A. collaris* Selys, and *A. australis* Selys, are all closely allied to the above. All these species have the "seven-mark" not formed, so that in this respect *A. Doddi* is just on the border line between those which possess it and those which do not. The formation of the "seven-mark" is usually complete in the larger species, and incomplete in the smaller.

6. AUSTROGOMPHUS Risi Martin.

♂. Total length 47 mm., abdomen 36 mm.; forewing 28.5 mm., hindwing 27 mm.

Wings: *neurulation* blackish. *Pterostigma* thick, black, 3.2 mm. *Membranule* very minute; slight saffroning on all wings from base to nodus. *Nodal Indicator*

13-14	9-10
9-11	8-10

Head: *eyes* brown; *occipital ridge* 1 mm., black, hairy, with a large yellow plate; *vertex* black, a yellow spot near occiput, the black colour extending to base of front; rest of *front* yellow; *postclypeus* black with a large yellow spot on each side touching the *anteclypeus* which is also yellow; the black on the postclypeus forms an irregular band across the face, narrow at both ends and in middle, swollen in two places; *labrum* yellow with a fine border of black carrying a row of small yellow hairs, and crossed in the middle by a black mark; *labium* and *genae* yellow; *mouth* thickly edged with black. Thorax: *prothorax* black, a triangular yellow mark on collar in front and another behind, with a small yellow double spot just in front of it. *Meso-* and *metathorax* jet black above; the mesepisternum marked with bright orange-yellow as follows: a border-mark; interalar ridge;

a fine mid-dorsal line, 1 mm. long; half-collar marks and dorsal stripes combined together on each side to form an excellent "seven-mark," of which the head is rather short, thick, and blunt; antehumeral stripe narrow, ending in a subtriangular spot near wing-joints. The sides are nearly all bright yellow, there being a touch of black on *E*, a thin irregular black mark along the first lateral suture, and a black spot over the spiracle (see Plate xxii., fig.6); *wing-joints* black, spotted with yellow; *scuta* and *scutella* broadly yellow. *Legs* black, underside of profemora yellow, coxæ pale brownish. *Abdomen*: 1-2 swollen, 3-6 slender, 7-10 swollen. Colour black, marked with yellow as follows: 1-2, a large dorsal mark, sides and auricles yellow; 3-6, a conspicuous dorsal line reaching along nearly whole of 3-4 shorter in 5, very faint in 6; also on each side a fairly large basal spot joining the dorsal line above; 7, basal half yellow above and also partly on sides, the yellow crossed on each side by a fine black line, rest black; 8, a spot low down on each side; 9, a smaller basal spot, low down on each side; 10, black. *Appendages*: *superior* 1.4 mm., separate at bases, fairly straight, slightly enlarged inwards near tips, and ending in a short point outwards; slightly hairy, pale yellow. Close up to the base is a curved black tubercle projecting downwards underneath, and not easily distinguished as part of the appendage. *Inferior* very short, thin, black, upcurved (see Plate xxiii., figs.3-4).

♀. Very similar to male, but differing from it as follows. Wings slightly larger; *occiput* with a tiny yellow central tubercle (see Plate xxii., fig 8). antehumeral band of *thorax* broader and more conspicuous. *Abdomen* broader and more cylindrical; markings of 1-2 very large and conspicuous, leaving only a small portion black on each side; basal spots of 3-4 very large, of 5-6 smaller; 7, basal half light yellow, lower part of sides and underside shaded with olive nearly throughout the segment; 8, a large spot on each side low down; 9, a pair of small basal lateral spots; 10, black. *Appendages* wide apart at bases, 1 mm., straight, tapering slightly, not very pointed, subcylindrical, hairy, bright yellow, tips shaded with brown.

Hab.—Atherton, N.Q. Rare; April, 1907. A single male, and several females, taken by Mr. E. Allen.

Martin described this species from a unique female (*loc.* Queensland) in the de Selys Collection. I was at first inclined to consider my specimens as a distinct species, partly because of their greater size and some small differences in details of colouration, but more especially because I sent a pair to M. Martin and he did not, apparently, connect them with his type. However, the two agree in all essential points, and in particular, I do not know of any other species in which the *labrum* has a black border carrying a row of small yellow hairs—a most distinctive character for this species.

The specimen in the de Selys Collection must have come from a different locality (possibly Gayndah), and this may account for minor differences.

Mr. Allen notes that the specimens he took were apparently not long emerged, and were flying in the long grass between the creek and railway station; they could have been caught easily by the hand. This is probably, therefore, a winter insect in North Queensland.

7. AUSTROGOMPHUS ARBUSTORUM Tillyard.

At Cooktown, in January, 1908, this insect was only just emerging, and the few specimens I took were considerably smaller than those found at Kuranda.

8. AUSTROGOMPHUS PRASINUS Tillyard.

Common at Cooktown, along the Endeavour River, where I found it freshly emerged in January, 1908. The colours are then bright orange-yellow and black, as in *A. Risi* Martin, to which this insect is closely allied. The rich green colour, which suggested the name to me, is clearly only found in the maturer insect.

9. AUSTROGOMPHUS ARENARIUS Tillyard.

Occurs sparingly in the grass along the banks of the Endeavour River, but is by no means common. There is also in the Macleay Museum, Sydney, a specimen from Derby, N.W. Australia, in

which *the last three segments are yellowish*. This condition is associated with the newly emerged insect and probably lasts for some time.

10. AUSTROGOMPHUS TURNERI Martin.

A single female, taken by Mr. H. Hacker, at Rocky, Cape York Peninsula, was given to me in bad preservation. I forwarded it to Mr. Martin for inspection. On its return from Europe it was almost destroyed by *Anthrenus*. This would have been the type-female of this species, only known from a single male in Dr. Ris' collection; but it was too far gone to be of any use. Now that the locality is known, fresh specimens should soon be procurable.

11. AUSTROGOMPHUS AUSTRALIS Selys.

The only specimen of this, apparently rare, species known to me is a male in the Macleay Museum, Sydney. *Loc.* South Australia.

12. AUSTROGOMPHUS GOULDI Selys.

Three males, in good condition, are in the National Museum Collection, Melbourne.

- { 13. AUSTROGOMPHUS LATERALIS Selys.
 { 14. A. OCCIDENTALIS Tillyard.

The description of a portion of a specimen from N. Australia, named *A. lateralis* by de Selys, apparently bears some points of resemblance to my *A. occidentalis*. The de Selys specimen is a female, with the abdomen entirely lacking! It is in the British Museum. It is quite possible the two species are very closely allied; the difference of locality is so great that they can scarcely be the same species.

EXPLANATION OF PLATES XXII.-XXIII.

Plate xxii.

- Fig.1.—*Austrogomphus melaleucæ*, n.sp. Thoracic colour-scheme.
 Fig.2.— " *bifurcatus*, n.sp. " "
 Fig.3.— " *comitatus*, n.sp. " "
 Fig.4.— " *manifestus*, n.sp. " "
 Fig.5.— " *Doddi*, n.sp. " "
 Fig.6.— " *Risi* Martin " "

Fig.7.—*Austrogomphus manifestus*, n.sp. Vulvar scale of ♀.

Fig.8.—,, *Risi* Martin. Back of occiput of ♀.

Fig.9.—,, *melaleuca*, n.sp. ,, ,,

Fig.10.—,, *comitatus*, n.sp. ,, ,,

Fig.11.—Reference figure for thoracic colour-schemes.

[*A*, mesepisternum; *B*, mesepimeron; *C*, metepisternum; *D*, metepimeron; *E*, mesinfraepisternum; *a*, border-mark; *b*, half-collar mark; *c*, dorsal stripe; *d*, antehumeral stripe; *e*, interalar ridge; *f*, mid-dorsal line; *g*, mesothoracic half-collar; *h*, mid-dorsal suture; *i*, humeral suture; *j*, first or upper lateral suture; *k*, second or lower lateral suture.]

N.B.—The figures are diagrammatic and not drawn to scale.

Plate xxiii.

Fig.1.—*Austrogomphus comitatus*, n.sp. Appendages of ♂, seen from above.

Fig.2.—,, ,, ,, ,, ,, seen sideways.

Fig.3.—,, *Risi* Martin ,, ,, seen from above.

Fig.4.—,, ,, ,, ,, seen sideways.

Fig.5.—,, *Doddi*, n.sp. ,, ,, seen from above.

Fig.6.—,, ,, ,, ,, seen sideways.

Fig.7.—,, *bifurcatus*, n.sp. ,, ,, seen from above.

Fig.8.—,, ,, ,, ,, seen sideways.

Fig.9.—,, *melaleuca*, n.sp. ,, ,, " seen from above.

Fig.10.—,, ,, ,, ,, seen sideways.

[All figures much enlarged and drawn to scale.]